

**This Page Is Inserted by IFW Operations
and is not a part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- **BLACK BORDERS**
- **TEXT CUT OFF AT TOP, BOTTOM OR SIDES**
- **FADED TEXT**
- **ILLEGIBLE TEXT**
- **SKEWED/SLANTED IMAGES**
- **COLORED PHOTOS**
- **BLACK OR VERY BLACK AND WHITE DARK PHOTOS**
- **GRAY SCALE DOCUMENTS**

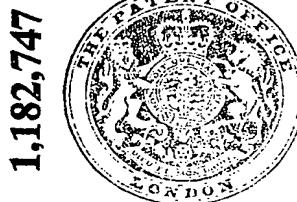
IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,182,747



1,182,747

Date of Application (No. 6226/68) and filing Complete
Specification: 8 February, 1968.

Application made in France (No. 97306) on
3 March, 1967.

Complete Specification Published: 4 March, 1970.

Index at Acceptance:—B7 H (C3C2, C1C4, C9K5, C9A, C16G1, C16K5, P1, P8, P4, P7A5).

International Classification:—B60 E 5/02.

COMPLETE SPECIFICATION

Improvements in or relating to a Longitudinal Engine and Transmission Unit for a Vehicle

We, AUTOMOBILES PEUGEOT, a French Body Corporate, residing at 75, Avenue de la Grande-Armée, 75 Paris, France, and REGIE NATIONALE DES USINES RENAULT, a French Body Corporate, residing at 8-10, Avenue Emile Zola, 92 Billancourt, France, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to longitudinal engine and transmission units for vehicles and the object of the invention is to provide an improved unit which is compact and of small overall size.

According to the invention, there is provided a longitudinal engine and transmission unit for a vehicle, wherein an axis common to the output shaft of the gearbox and the input shaft of the differential is parallel to and below the longitudinal crankshaft of the engine, the gearbox being in front of or at the rear of the engine and the engine cylinders being inclined over the differential at greater than 45° to the vertical.

Further features and advantages of the invention will be apparent from the ensuing description of embodiments thereof with reference to the accompanying drawings.

In the drawings:

Figure 1 is a diagrammatic elevational view from behind of an engine and transmission unit, a part of the case of the differential being cut away;

Figure 2 is a longitudinal developed sectional view taken along line 2-2 of Figure 1;

Figure 3 is a partial second view of a modification;

40 In Figures 1 and 2, the engine and transmission unit consists of an engine M¹, a gearbox B¹, and a differential P¹.

The engine M¹ is diagrammatically represented

sented by its crankshaft 1 having an axis W-W and its case 2 (Figure 1). It is transversely highly inclined from the vertical, the cylinder axes making with the horizontal plane H-H an angle α of around for example 10° (Fig. 1).

The gearbox B¹ and the differential P¹ are disposed on a lower level than the engine, the latter being inclined over the differential and the gearbox being located, in plan, at the rear or in front of the engine.

Disposed at the output end of the shaft 5 of the engine is a conventional clutch 3 within a case 4 which extends downwardly under the case 2 of the engine. The driven shaft 5 of the clutch extends out of the case 4 and into the gearbox B¹ through a sealing device 6.

The gearbox B¹ is of the mechanical type having a conventional configuration. Its case is in two parts 7, 7^a and is fixed to the case 4-4^a of the clutch 3. Its input shaft 8 is connected to the driving shaft 5 of the clutch through a gear transmission 9 and 10. The output shaft 11 extends through a sealing element 12 into the downward extension of the clutch case 4 and is connected to the input shaft 14 of the differential P¹ through a sleeve 13. This shaft 14 also extends through a sealing element 15 into the extension of the clutch case and terminates, adjacent the differential, in a gear 16 which meshes with the gear 17 of the hypoid differential P¹. The axis X-X common to the shafts 11 and 14 is parallel to the axis W-W of the crankshaft 1 but lower down.

The case 18 of the differential is fixed at 19 against the right face as viewed in Fig. 2 of the extension 4^a of the clutch case, in which it is centered, and under the case 2 of the engine M¹ by lugs 20. The engine 85 is inclined over the differential as shown

45

50

55

60

65

70

75

80

85

in Figure 1 so as to allow a free passage for the wheel-driving axles 21. The transverse axis of the latter is located at Y-Y in front of the axis Z-Z of the gear 17.

5 The counter gear 9-10 at the output end of the clutch case 4, 4^a allows the gearbox B^a to be placed below the axis W-W of the crankshaft 1. This permits either considerably reducing the sloping or deformation 10 of the sproon 23 of the vehicle (Figure 2) if the unit is mounted as a front-wheel drive with the gearbox at the rear of the unit, the front of the latter being on the right side of Figure 2, or placing the battery or 15 the radiator at b above the gearbox if the unit is mounted in the other direction (the rear thereof being at the right).

The described arrangement permits employing a gearbox and differential assembly 20 with a much-reduced overall longitudinal and vertical size.

Further, a differential set which differs from the oil of the gearbox can be employed, since the gearbox is sealed off by 25 the sealing elements 6, 11 and 15 and can operate with a more fluid oil. This is an advantage as concerns the operation of its conventional synchronizers.

Figure 3 shows, as a modification of the 30 unit, an arrangement of the gearbox B^a. A case 44 constitutes a clutch case and a half-case for the gearbox.

Another half-case 44^a of the gearbox is 35 closed by a plate 45. The driven shaft 46 of the clutch extends through the case 44 into the gearbox B^a by way of a sealing device 47. The gearbox is of the mechanical type. Its input shaft 48 is connected to the driven shaft 46 of the clutch through 40 a gear transmission 49 and 50. Its output shaft 51 extends through a sealing element 52 in the downward extension of the clutch case 44 and is connected to the input shaft 14 of the differential 13 by the sleeve 13 45 (Fig. 2).

The gearbox B^a has the following 50 features: the gear 50 integral with shaft 48 is placed in the middle of the latter. The primary shaft 48 with which gears 53, 54 and 55 are integral carries idler gears 56 and 57 which can be connected separately to the shaft 48 by a dog clutch 58. The output shaft 51 with which gears 59 and 60 are integral carries idler gears 61 and 62 55 which can be connected separately to said

shaft 51 by a dog clutch 63. The latter comprises a gear 64 which is connected to the shaft 51 to rotate with the latter and can be connected to the gear 54 of the shaft 48 through an idler gear (not 60 shown).

Although specific embodiments of the invention have been described, many modifications and changes may be made therein without departing from the scope of the 65 invention as defined in the appended claims.

WHAT WE CLAIM IS:—

1. A longitudinal engine and transmission unit for a vehicle, wherein an axis 70 common to the output shaft of the gearbox and the input shaft of the differential is parallel to and below the longitudinal crank-shaft of the engine, the gearbox being in front of or at the rear of the engine, and the engine cylinders being inclined over the differential at greater than 45° to the vertical.

2. A unit as claimed in claim 1, wherein the engine is axially adjacent a clutch which 80 drives a gear connected by a transmission to the input shaft of the gearbox which is of the mechanical type.

3. A unit as claimed in claim 2, wherein the clutch case is extended downwardly and 85 constitutes a brace between the gearbox and differential cases, the output shaft of the gearbox and input shaft of the differential extending into the said extension of the clutch case in which they are interconnected 90 by a sleeve.

4. A unit as claimed in claim 3, wherein the gearbox and differential cases are separated from the clutch case by seals.

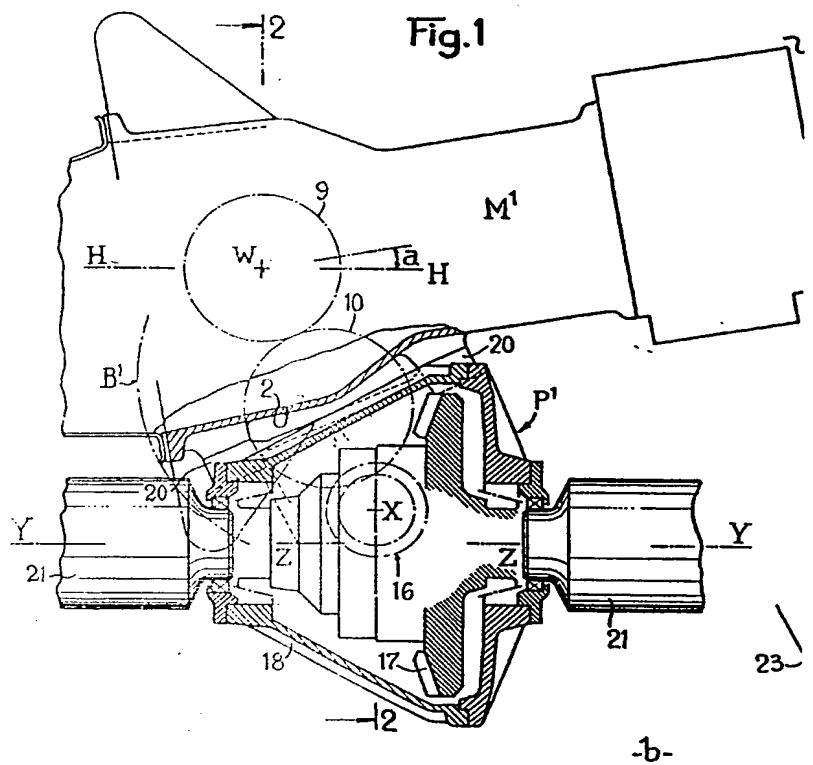
5. A unit as claimed in claim 1, in which 95 an input gear of the gearbox integral with the primary shaft is substantially in the middle of the primary shaft.

6. An engine and transmission unit, substantially as described with reference to and 100 as shown in Figures 1 and 2 of the accompanying drawings.

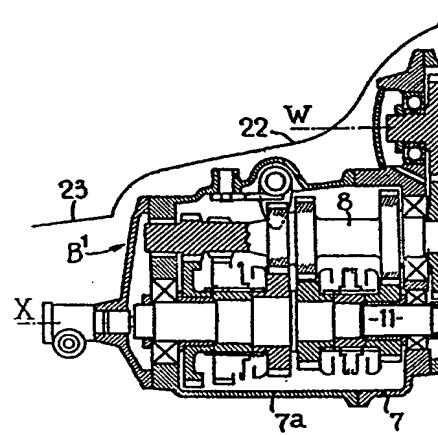
7. An engine and transmission unit, substantially as described with reference to and 105 as shown in Figure 3 of the accompanying drawings.

MARKS & CLERK,
Chartered Patent Agents,
Agents for the Applicants.

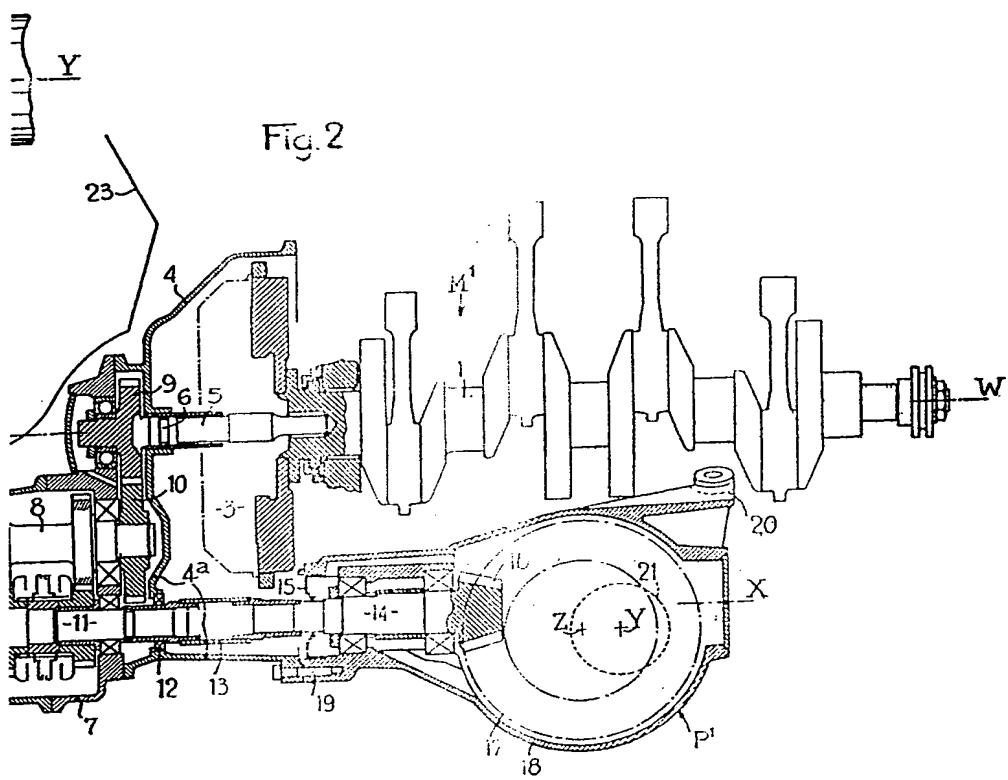
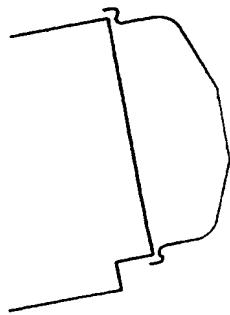
Fig.1



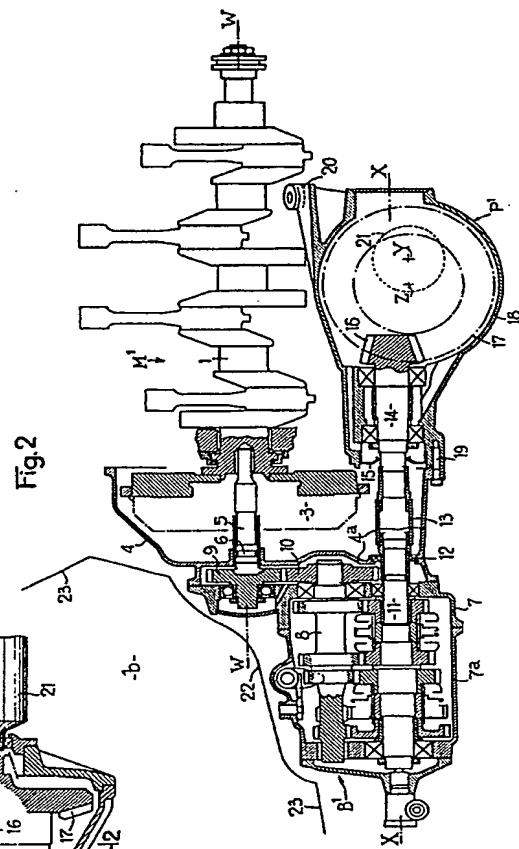
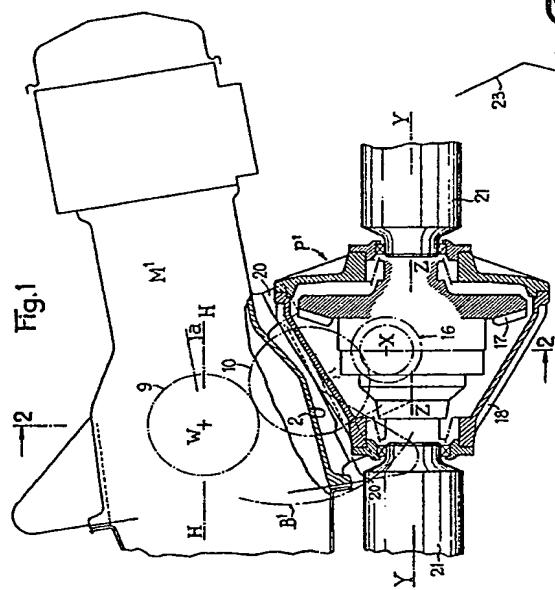
-b-



1,182,747 COMPLETE SPECIFICATION
2 SHEETS
*This drawing is a reproduction of
the Original on a reduced scale.*
SHEET 1



1,182,747 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of
the Original on a reduced scale.*
SHEET 1



1,182,747
2 SHEETS

COMPLETE SPECIFICATION
*This drawing is a reproduction of
the Original on a reduced scale.*
SHEET 2

